

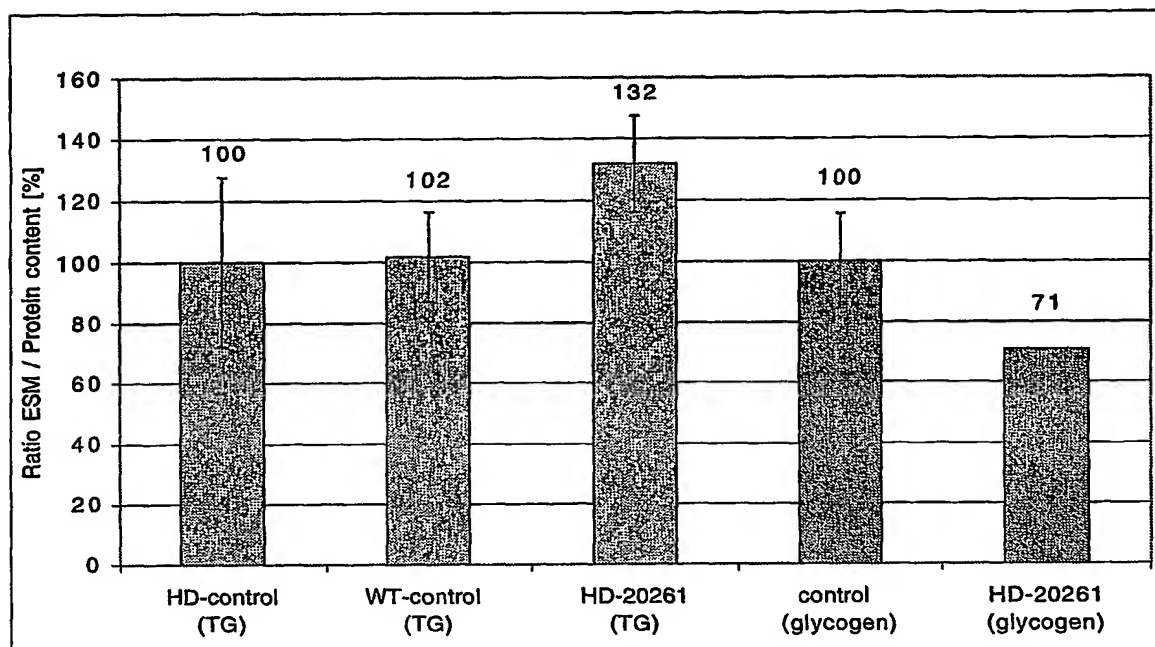
Figure 1. Energy storage metabolite content of a *Drosophila PRL-1* mutant

Figure 2. Molecular organization of the *PRL-1* gene (GadFly Accession Number CG4993)

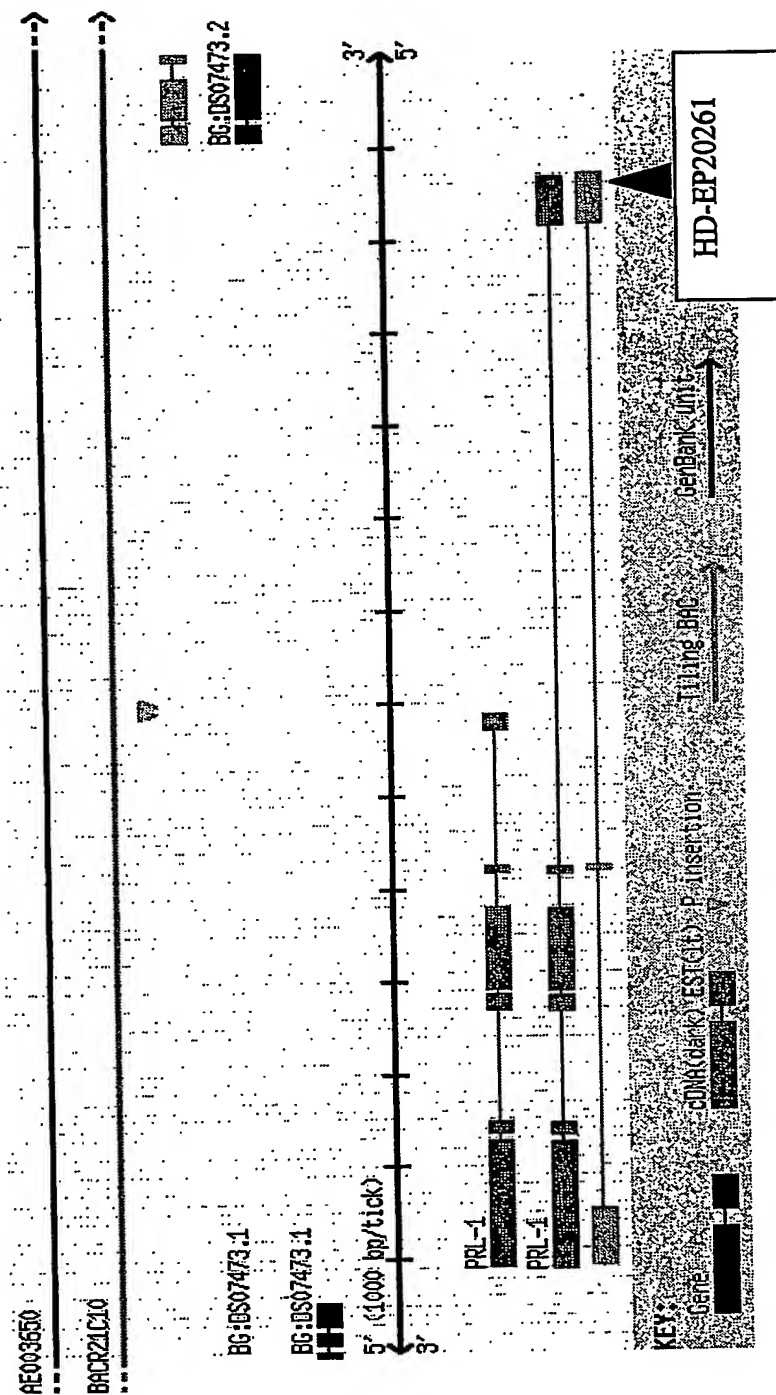


Figure 3. Nucleic acid sequences encoding the human proteins of the invention and amino acid sequences of the proteins of the invention

Figure 3A. Homo sapiens protein tyrosine phosphatase type IVA, member 1 (Prl-1), Nucleic acid sequence (SEQ ID NO: 1)

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1  ccggctcggt  acgcgctctg  ctccgagccg  ctcaactgct  ggtagagtct  ggtgcccccg
61  ccgtcgccctg  catcgccgcc  accgcccgtc  cgccacgacc  accgcccgtc  cctgccctgc
121  agccaccgcc  accgcctgtg  tcgcccgcgc  ctccgggaccg  gctgtatgat  taggccacaa
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241  tttctgaagg  gcagtggaga  ttactgccag  gcacagcacg  acctctatgc  agacaagtga
301  actgtagaaa  ctgattactg  ctccaccaag  aagcccccat  aagagtgggt  atcctggaca
361  cagaagtgtt  gaattgaaat  ccacagagca  ttttacaaga  gttctgacct  ggatggggta
421  aacctcagtg  cacttctttt  ctgttggcct  cagtattact  ggattgaaga  attgctgctt
481  cttgttagga  ggttcatttc  acttatcatt  acttacaact  tcatactcaa  agcactgaga
541  atttcaagtg  gagtatattg  aagtagactt  cagtttcttt  gcatcatttc  tgtattcaat
601  ttttttaatt  atttcataac  cctattgagt  gttttttaac  taaattaaca  tggctcgaat
661  gaaccgcca  gctcctgtgg  aagtcacata  caagaacatg  agatttctta  ttacacacaa
721  tccaaccaat  ggcaccttaa  acaaatttat  agaggaactt  aagaagtatg  gagttaccac
781  aatagtaaga  gtatgtgaag  caacttatga  cactactctt  gtggagaaag  aaggtatcca
841  tgttcttgat  tggccttttg  atgatgggtc  accaccatcc  aaccagattg  ttgatgactg
901  gttaagtctt  gtgaaaatta  agtttcgtga  agaaccgtgt  tgttgatttg  ctgttcattg
961  cgttgcaggg  cttgggagag  ctccagtact  tgttgcccta  gcattaattg  aaggtggaat
1021  gaaatacgaa  gatgcagtac  aattcataag  acaaaagcgg  cgtggagctt  ttaacagcaa
1081  gcaacttctg  tatttggaag  agtatcgctc  taaaatgcgg  ctgcgtttca  aagattccaa
1141  cggtcataga  aacaactgtt  gcattcaata  aaattggggt  gcctaattgt  actggaagtg
1201  gaacttgaga  tagggcctaa  tttgtttata  atattagcca  acatgtttgg  ttagtaagtc
1261  taatgaagct  tccataggag  tattgaaagg  cagttttacc  aggcctcaag  ctagacagat
1321  ttggcaacct  ctgtattttg  gttacagtca  acctattttg  atacttggca  aaagattcct
1381  gctgtcagca  tataaaatgt  gcttgtcatt  tgtatcaatt  gacctttccc  caaactatgc
1441  agtattgagt  tatgacttgt  taaactatgt  cccatgccag  aatcttatca  atacataaga
1501  aatttaggaa  gattaggtgc  caaaatcccc  agcacaatac  ttgtatattt  ttagtaccat
1561  acagaagtaa  aatcccagga  actatgaaca  ctagacctta  tgtggtttat  tcttcaatc
1621  atttcaaaaa  ttgaaagtag  ggcctacatg  gttattttgc  tgctcacttt  atgtttacat
1681  ctccacatt  cataccaata  tacgtcaggt  ttgcttaacc  attgattttt  tttttttttt
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1801  aaaaacctcc  attttgaaaa  tctacgttgt  acagaagcac  atgtctttaa  tgtcttcaga
1861  caaaaagcc  ttacattaat  ttaatttttg  cactctgagg  tgcaacttaa  caggtagggc
1921  ctgagaaaag  aatgggaggg  ggctattaat  tattttttag  caaaatgttg  cctttgtctt
1981  gtgcaaacat  gtagaatatg  ctctttaatt  tagtaaaata  tttttttaaa  aggtagagat
2041  gctttgttat  tgtaatcata  aacttcctga  aattcttgta  atttttttcc  catacttatc
2101  agaagtgtgt  ttaccaactt  atttttgttt  gaaagtgtga  tttttttttt  ccttcccaac
2161  ctctcttgca  aaaaaagaaa  tgggtttctg  ctaatgaatt  gagcacatct  aatattttat
2221  atgccttttg  gagctgtgtg  agttaatat  tgatacttga  caatttgttt  tattatgtaa
2281  ttgataaaat  ggtgatgtgt  attaatgtta  gttcaaccat  atattttata  tgcctgggga
2341  tgtgtgggta  tagttctgtg  ggagaaataa  ttttgtcagt  gttcaccagc  ttgtaaaaac
2401  ttagtgcgag  agctgaaaca  tctaaataaa  taatgacatg  catttatcat  cattgagatt
2461  ggtttgtctt  aaattaactt  attttgtaga  agacaaaatg  aattgcactt  cacttaattg
2521  gtgtcctcat  ctttttacia  ataaatgaag  gattataaat  gatgtcagca  ttttagtaaa
2581  cttttagaca  aaatttggtt  gggctcattc  tgaaaaactt  aatactaaaa  gcactttcca
2641  ttatatactt  tttaaagggt  tagataattt  tgaaccaatt  tattattgtg  tactgaggag
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2761  tttgtgcaac  ttctgagcct  cagttttctc  ctttgcaaat  taataattac  atacctttat
2821  agattttgaa  attaatttta  atattagtat  ttggtacatg  aaggcttaat  gtttaagttc
2881  ctttaattgat  ccacaataat  ccctttgatc  acgttaatct  aaatctagat  gtctttgtct
2941  aatttttttt  gaatagcagt  tataaatgta  aaggactcaa  agtttaagta  aaaagtgata
3001  ctccaccttg  tgtttcaaag  aatttagttc  cacctcttca  taccagttta  acacttaata

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3061 tattttcattg gatttttagac agggcaaaaag gaagaacagg ggcctctgga ggcccttggt
3121 tattttaaadc ttggattatt tgtgatagta atcacaaatt tttggctaata ttttaacctg
3181 aggtttttggt ttttttttaa aggaaatgca gcctagtctt gagaacataa ttttatataa
3241 tcaattacta aatgttaaacc tattaccaca cagcccataa aacagcattt gcgtttattg
3301 agagagagga tgtgccatca tgattaatga aaactatctt ttgagtttga aaagaaatta
3361 atttgcagtg tttggattgt atatatgggtg ctaaaaataa attaatttac tttataaacc
3421 ttatctgtac attatacgat gtgatgaaat ttgcttttta tccaaatatt ttgtatcttg
3481 taaatatggc taattatagg aatgcctata atacatctta gattccttat atctaataag
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3601 atttggttac ttgggtttgg atacccttag tgggatgatg taaatagagg ctagctacct
3661 aggccttgct atagcaacca taatgttgat gtaagtaatg cggttactga atcataagaa
3721 aatgccatct ctttttagtt gaaggaaaac tctggaagta ggtgccattg gtcattctgc
3781 agtgcactgc aaccattggt tcccctagtg cctcttttcc cctagggcat tgctctccta
3841 ttcccacgcc ttaacacagc tctataccta gaagcagcca gcccaggcat gcagtcacat
3901 ttaatcacat cccccttcta gagtgttcca aaatgatgta gtccctcaac ttggctaaag
3961 aatctcaatc tcttgaaatt tattttttta atgtcatatt catctggtaa atctctactg
4021 tttgccaggc atttaagaat atggcaaaga acataaaaga tgggtgtcacc agattttggt
4081 caccaatgag tacccgaccc gttgccatga ttaagagaga atgctttcta ttggagtttc
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4201 cttttacatg taaacaatga agttatttca aagttaagtt ttaaacaaaa tacatgaagt
4261 agtgtctgcc atacatgtta atattctaca ttcttgcttc cttaaattaa tatgtttgtg
4321 tgtatatatg tgcctcacac ctgaattgaa aattaaagac tggtttaaaa gtggttaaaa
4381 aaaaaaaaaa aaaa

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Figure 3B. Homo sapiens protein tyrosine phosphatase type IVA, member 1 (Prl-1), Amino acid sequence (SEQ ID NO: 2)

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1 marmnrpapv evtyknmrfl ithnptnatl nkfielkky gvttivrvce atydttlvek
61 egihvlwdpf ddgappsni vddwlslvki kfreepgcci avhcvaglgr apvlvalali
121 eggmkayedav qfirqkrrga fnskqllyle kyrpkmlrf kdsnghrnnc ciq

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Figure 3C. Homo sapiens protein tyrosine phosphatase type IVA, member 2 (Prl-2), Nucleic acid sequence, transcript variant 1 (SEQ ID NO: 3)

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1 agcgggggctg cgcgaagtca tcgctgttcc agacagcgat gactcgagag cgggtgggggt
61 ggccggcgca tcggccgggc tgtaaccgtc gtctgtccgg gagcggtgg agcggcagcg
121 gcggccgggc acggcgcgag gtgacgccac agggcagcgg cggcagcgga ggcagcgcg
181 gcagcaggag acgcagcggc ggccgcagca gcagcagcaa gacggactcg tggagacgcg
241 ccgcccgcgc cgcgcgggg cggggccggg tgtcgcgcgc cgaggctggg ggggagtcgt
301 cgccgcgcgc gccaccgcta ccgcccgcgc cgccgcgcgc gaggtgactg aggagagagg
361 cgcctcctcg ctcccgcac cgcgggactt caatgcccag tcccagctc gccagcgttt
421 ttcgttgga tatacgttgc acatttatgg cgattctgag tgtgagggca gacttctgcc
481 aggtcagca cagcattttc gctgacaagt gagcttggag gttctatgtg ccataattaa
541 cattgccttg aagactcctg gacaccgaga ctggcctcag aaatagttgg cttttttttt
601 tttttaattg caagcatatt tcttttaatt actccagtaa aattaagcat caagtaaaca
661 agtggaagt gacctacact ttttaactgt ctactagtg cctaaatgta gtaaaggctg
721 ctttaagttt gtatgtagtt ggattttttg gagtccgaat atttccatct gcagaaattg
781 agggccaaat tgaatttgga ttcaagtggg ttctaaatac tttgcttatc ttgaagagag
841 aagcttcata aggaataaac aagttgaata gagaaaacac tgattgataa taggcatttt
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961 cactttcccc atcacactca cagcagcgtc tatgagaaca tgcgttttct gataactcac aaccctacca
1021 cagcccctgt ggagatctcc tatgagaaca tgcgttttct gataactcac aaccctacca
1081 atgctactct caacaagttc acagaggaac ttaagaagta tggagtgcgc actttgggtc
1141 gagtttgtga tgctacatat gataaagctc cagttgaaaa agaaggaaat cacgttctag
1201 attggccatt tgatgatgga gctccacccc ctaatcagat agtagatgat tggttaaacc

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1261 tgttaaaaac caaatttcgt gaagagccag gttgctgtgt tgcagtgcac tgtgttgacg
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1441 tttatttgga gaaataccga cctaagatgc gattacgctt cagagatacc aatgggcatt
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1621 attcagtact cctcaaccac tctcctaata attggaacaa aagcaaacaa aaaagaaatc
1681 tctctataaa atgaataaaa tgtttaagaa aagagaaaga gaaaaggaaat taattcagtgt
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1861 aggcctgtgc aaaaccatct gtttggggag cacactcttc cattatgctt ggcacataga
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1981 tttccctctt tttttccctt ctctcctaca tctccctttt cccccgatcc aagttgtaga
2041 tggaatagaa gcccttggtg ctgtagatgt gcgtgcagtc tggcagcctt aagcccacct
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2161 atatatattc caggtgggtt ttagtcttta ctgatgaaag ggtgttcattg ttagtttctt
2221 caaaacccta tctaatacta ggcaaagtag ccaagagcct tttgttttgt ttttattttg
2281 ataaattagt ggagaaatgg cattttaaga ggagtctctt ctcaacttac ctgagagtcg
2341 aattcttctc ttccctaacc aatgaagcta agtggttatc ccagaaactt gtcttctaaa
2401 agggaggact ccaggccatc aataaagatg tccaggcagt gagcgtactt tttacaccct
2461 gtagaattgt gggctgtagc gttactctga ttttctgtct agtatcagag aatgctggta
2521 gcttaaaatt tttatttttag gacttgtaga atgcttgtgg tatgtgtttt ccaaactgcc
2581 cagcaaatct acataattttc gacttgagaa atgcttgtgg tattactagg ttttttgaga
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2701 ttaaaaaaaa aaaatccctg gttttaaacc agagacatcg tgcaacccaa tgagttagtga agggactgtg
2761 aggcataaac agggtagaag tagcattttt gcagattctt ggctgggttt agtgactga
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3721 tttcgattta atgaagtatt gctagctgaa gccagtttga catagagaga tgtcagattg
3781 atttgaaagg tgtgcagcct gattttaaac caaacctga acccttttaa agaacaataa
3841 aacatatatt acacgtcaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa
3901 aaaaaaaaaa aaaaaaaaaa aaaaaa

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Figure 3D. Homo sapiens protein tyrosine phosphatase type IVA, member 2 (Prl-2), Amino acid sequence transcript variant 1 (SEQ ID NO: 4)

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1 mnrpapveis yenmrflith nptnatlnkf teelkkygvt tlrvvcdaty dkapvekegi
61 hvldwfpddg appnqivdd wlnllktkfr eepgccvavh cvaglggrapv lvalaliecg
121 mkyedavqfi rqkrrgafns kqllylekyr pkmlrlfrdt nghccvq

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Figure 3E. Homo sapiens protein tyrosine phosphatase type IVA, member 2 (Prl-2), Nucleic acid sequence, transcript variant 2 (SEQ ID NO: 5)

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1 agcgggggctg cgcgaagtca tcgctgttcc agacagcgat gactcgagag cgggtgggggt
61 ggcgggcgcga tcggccgggc tgtaaccgtc gtctgtccgg gagcggctgg agcggcagcg
121 gcgcccgggc acggcgcgag gtgacgccac agggcagcgg cggcagcggg ggcagcggcg
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241 ccgccgcccgc cgcgcggggg cggggccggg tgtcgcgcgc cgaggctggg ggggagtcgt
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361 cgcctcctcg ctcccggcac cgcgggactt caatgcccag tcccagctc gccagcgttt
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481 aggtcagca cagcattttc gctgacaagt gagcttgagg gttctatgtg ccataattaa
541 cattgccttg aagactcctg gacaccgaga ctggcctcag aaatagttgg cttttttttt
601 tttttaattg caagcataatt tcttttaatt actccagtaa aattaagcat caagtaaaca
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841 aagcttcata aggaataaac aagttgaata gagaaaacac tgattgataa taggcatttt
901 agtgggtctt ttaatgtttt ctgctgtgaa acatttcaag atttattgat tttttttttt
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1141 gagtttgtga tgctacatat gataaagctc cagtggaaa agaaggaatc cacgttctag
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1321 gattgggaag ggcacctgtg ctgggtgcac ttgctttgat tgaatgtgga atgaagtacg
1381 aagatgcagt tcagtttata agacaaaaaa gaaggggagc gttcaattcc aaacagctgc
1441 tttatttgga gaaataccga cctaagatgc gattacgctt cagagatacc aatgggcatt
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1801 aatctcctgt ctttttaaac tttttcaaaa taggtctcta aggaaaacca gcagaacatt
1861 aggcctgtgc aaaaccatct gtttggggag cacactcttg gcacatagat ctccctgtgg
1921 tgggattttt ttcccttttt ttgtggggga ggggtgggtg tatatttttc cctctttttt
1981 tccttcctct cctacatctc ccttttcccc cgatccaagt ttagatgga atagaagccc
2041 ttgttgctgt agatgtgcgt gcagtctggc agccttaagc ccac

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Figure 3F. Homo sapiens protein tyrosine phosphatase type IVA, member 2 (Prl-2), Amino acid sequence transcript variant 2 (SEQ ID NO: 6)

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1 mnrapveis yenmrflith nptnatlnkf teelkkygvt tlrvvcdaty dkapvekegi
61 hvldwfpddg apppnqivdd wlnllktkfr eepgccvavh cvaglgrapv lvalaliecg
121 mkyedavqfi rqkrrgafns kqllylekyr pkmlrlfrdt nghccvq

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Figure 3G. Homo sapiens protein tyrosine phosphatase type IVA, member 2 (Prl-2), Nucleic acid sequence, transcript variant 3 (SEQ ID NO: 7)

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1 agcgggggctg cgcgaagtca tcgctgttcc agacagcgat gactcgagag cgggtgggggt
61 ggcgggcgcga tcggccgggc tgtaaccgtc gtctgtccgg gagcggctgg agcggcagcg
121 gcgcccgggc acggcgcgag gtgacgccac agggcagcgg cggcagcggg ggcagcggcg
181 gcagcaggag acgcagcggc ggccgcagca gcagcagcaa gacggactcg tggagacgcg

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241 ccgccgccgc cgccgccggg ccggggccggg tgtcgcgcgc cgaggctggg ggggagtcgt
301 cgccgccgcc gccaccgcta ccgccgccgc cgccgccgcc gaggtgactg agggagagagg
361 cgccctctcg ctcccgccac cgccggactt caatgccag tcccagctc gccagcgttt
421 ttcgttgga tatacgttgc acatttatgg cgattctgag tgtgagggca gacttctgcc
481 aggctcagca cagcattttc gctgacaagt gagcttgagg gttctatgtg ccataattaa
541 cattgccttg aagactcctg gacaccgaga ctggcctcag aaatagttgg cttttttttt
601 tttttaattg caagcatatt tcttttaatg actccagtaa aattaagcat caagtaaaca
661 agtggaaagt gacctacact ttttaacttg ctactagtg cctaaatgta gtaaaggctg
721 cttaagtttt gtatgtagtt ggattttttg gaggccgaat atttccatct gcagaaattg
781 agggccaaat tgaatttgga ttcaagtgga ttctaaatac tttgcttatt ttgaagagag
841 aagcttcata aggaataaac aagtgaata gagaaaacac tgattgataa taggcatttt
901 agtgggtctt ttaattgttt ctgctgtgaa acatttcaag atttattgat tttttttttt
961 cactttcccc atcacactca cagcacgct cacacttttt atttgccata atgaaccgtc
1021 cagccctgtt ggagatctcc tatgagaaca tgcgttttct gataactcac aaccctacca
1081 atgctactct caacaagttc acagagggaac ttaagaagta tggagtgacg actttggttc
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1201 aaaagaaggg gagcgttcaa ttccaaacag ctgctttatt tggagaaata ccgacctaa
1261 atgcgattac gcttcagaga taccaattgg cattgctgtg ttcagtagaa ggaaatgtaa
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1381 tggaatatta cctgtgtcat caaagtagtg atggattcag tactcctcaa ccactctcct
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1501 agaaaagaga aagagaaaag gaattaattc agtgaaggat gattttgtct ctagttttgg
1561 agtttgaaat tctgccagga ttgaattatt ttgaaatctc ctgtcttttt aaactttttc
1621 aaaatagggtc tctaaggaaa accagcagaa cattaggcct gtgcaaaacc atctgtttgg
1681 ggagcacact ctt

```

Figure 3H. Homo sapiens protein tyrosine phosphatase type IVA, member 2 (Prl-2), Amino acid sequence, transcript variant 3 (SEQ ID NO: 8)

```

1 mnrapveis yenmrflith nptnatlnkf teelkkygvt tlrvvcdaty dkapvekegi
61 hvlkkkgsvq fqtaalfgei pt

```

Figure 3I. Homo sapiens protein tyrosine phosphatase type IVA, member 3 (Prl-3), Nucleic acid sequence (SEQ ID NO: 9)

```

1 tgactatcca gctctgagag acgggagttt ggagttgccc gctttacttt ggttgggttg
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121 ttatccaaac agtgggcagc ttcttcccc acaccaagt atttgacaa tatttgtgag
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1021 gcgaggagcc cctcggggcc tgggtggcct ctgggcccct tctcctgtct ccgccactcc
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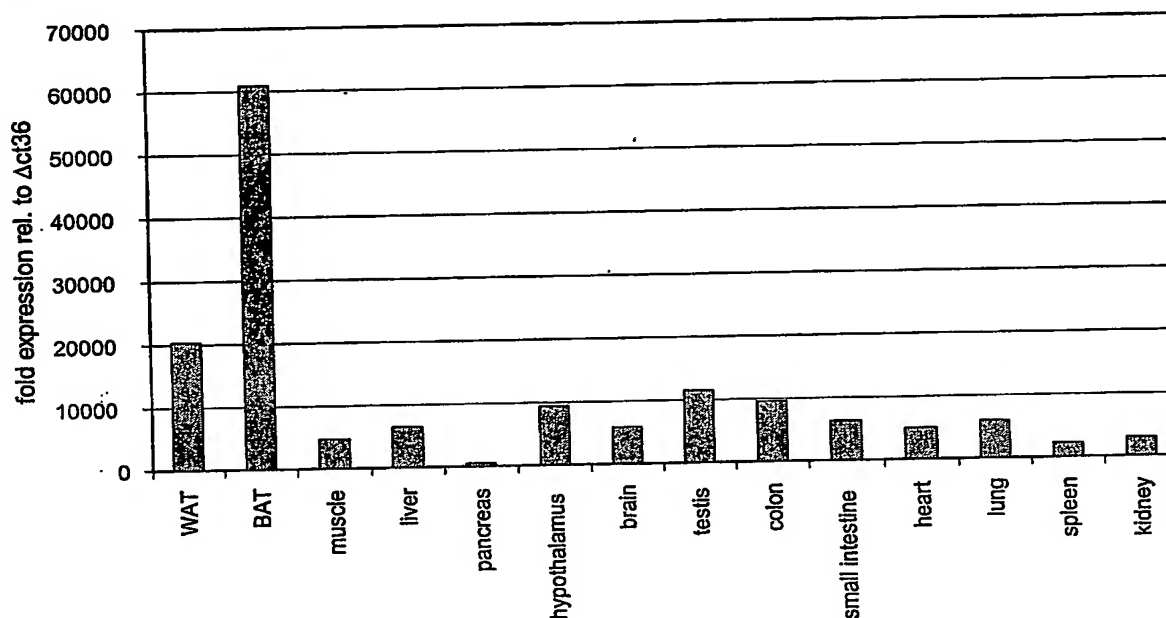
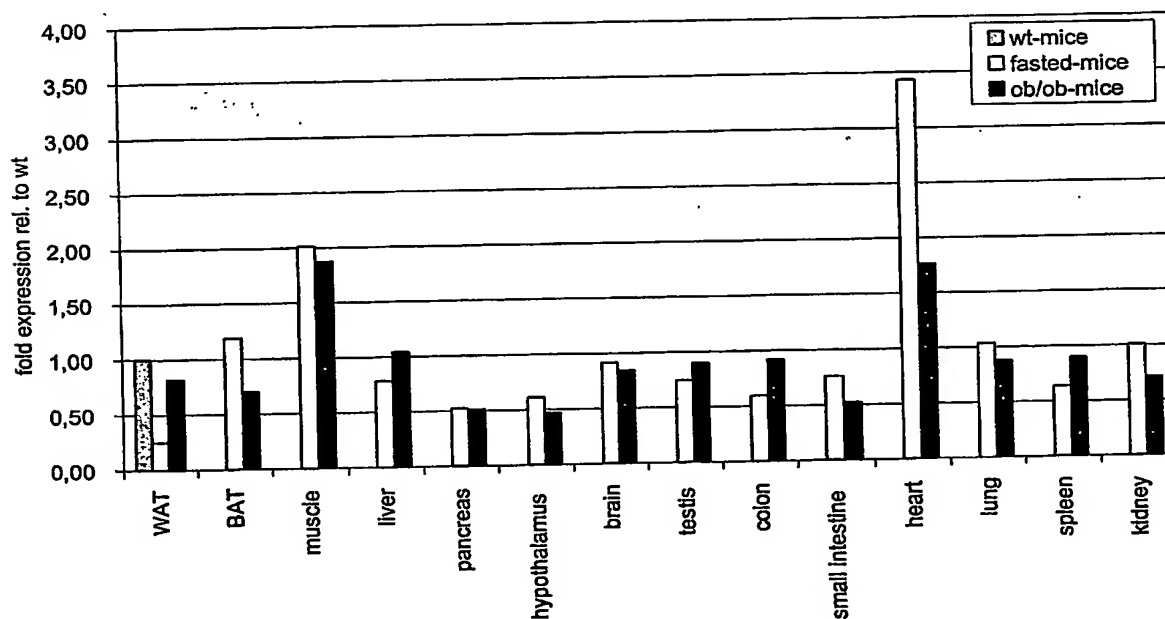
8 / 21

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1201 ttttgtaacc actgggcccc cagccctctt tttgcgaccc cttgtcctga cctgttctcg
1261 gcaccttaaa ttattagacc ccggggcagt caggtgctcc ggacacccga aggcaataaa
1321 acaggagccg tgaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa
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**Figure 3J. Homo sapiens protein tyrosine phosphatase type IVA, member 3 (Prl-3),
Amino acid sequence (SEQ ID NO: 10)**

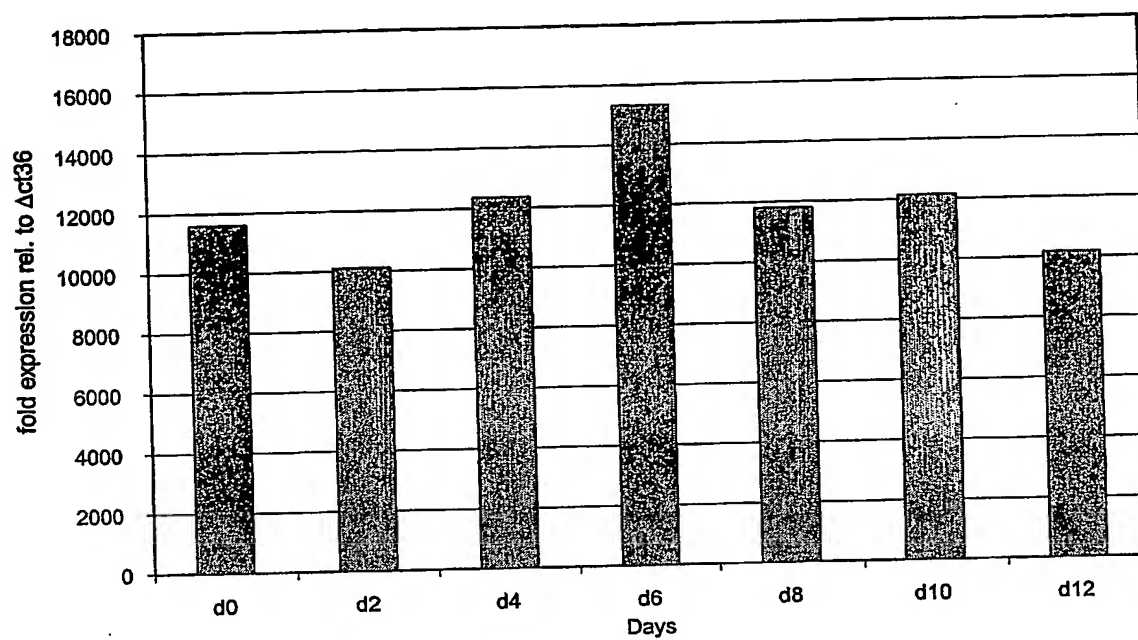
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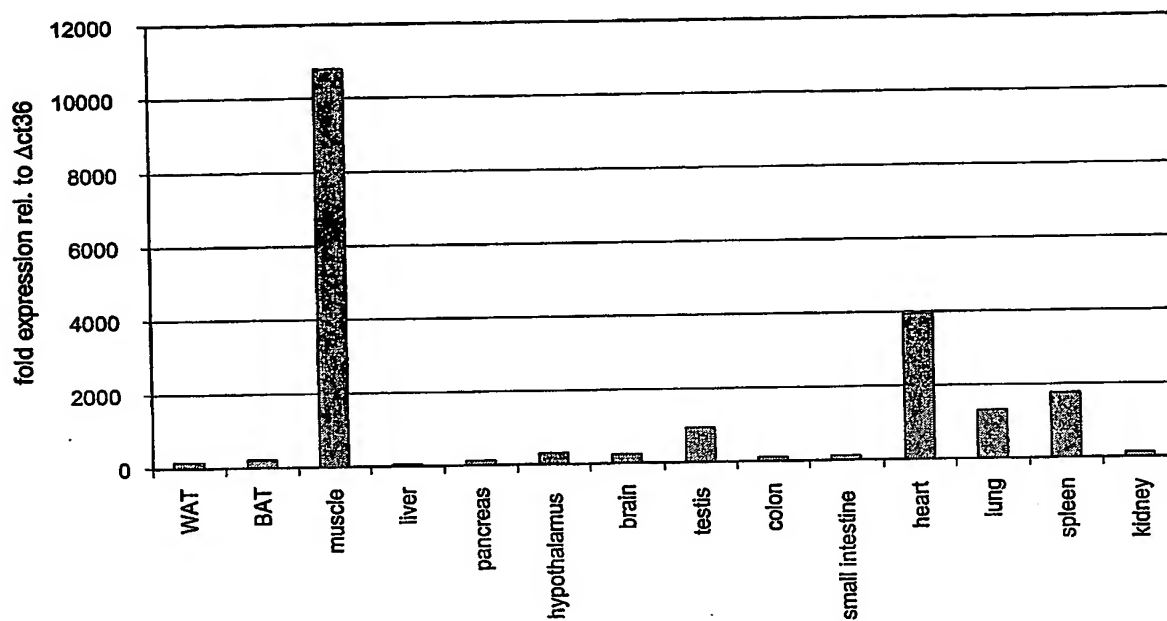
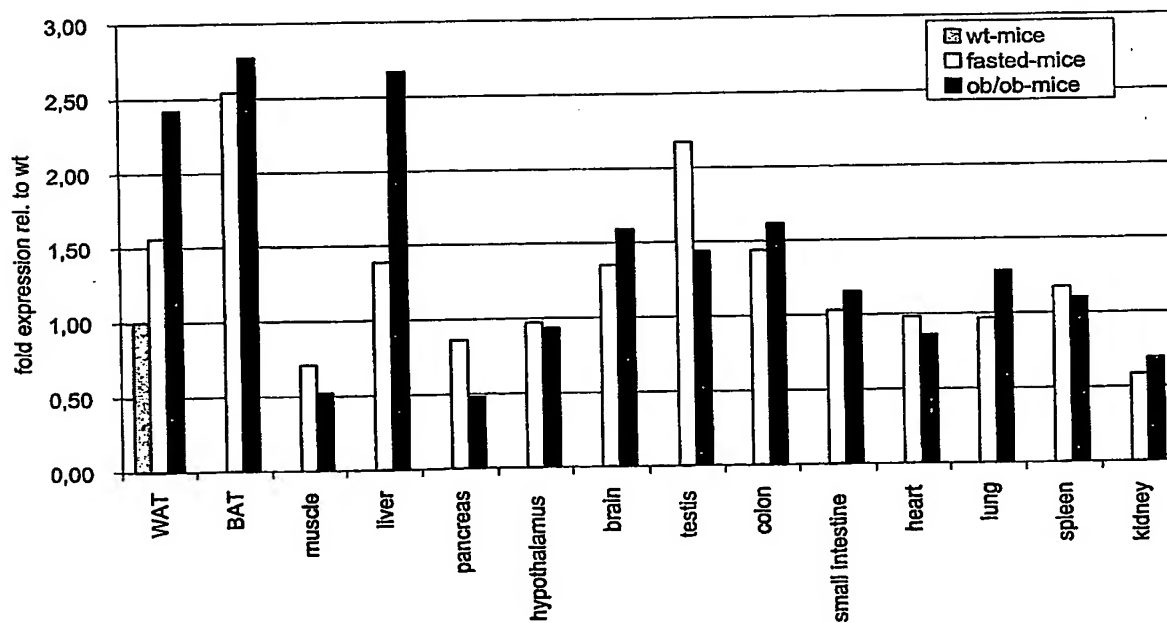
Figure 4. Expression of Prl-1 in different mammalian models**Figure 4A. Real-time PCR analysis of Prl-1 expression in wild type mouse tissues****Figure 4B. Real-time PCR analysis of Prl-1 expression in different mouse models**

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Figure 4C. Real-time PCR analysis of Prl-1 expression in adipocytes during differentiation of 3T3-L1 cells from preadipocytes to mature adipocytes



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Figure 4D. Real-time PCR analysis of Prl-3 expression in wild type mouse tissues**Figure 4E. Real-time PCR analysis of Prl-3 expression in different mouse models**

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Figure 4F. Real-time PCR analysis of Prl-3 expression in wild type mice fed a high fat diet compared to mice fed a control diet

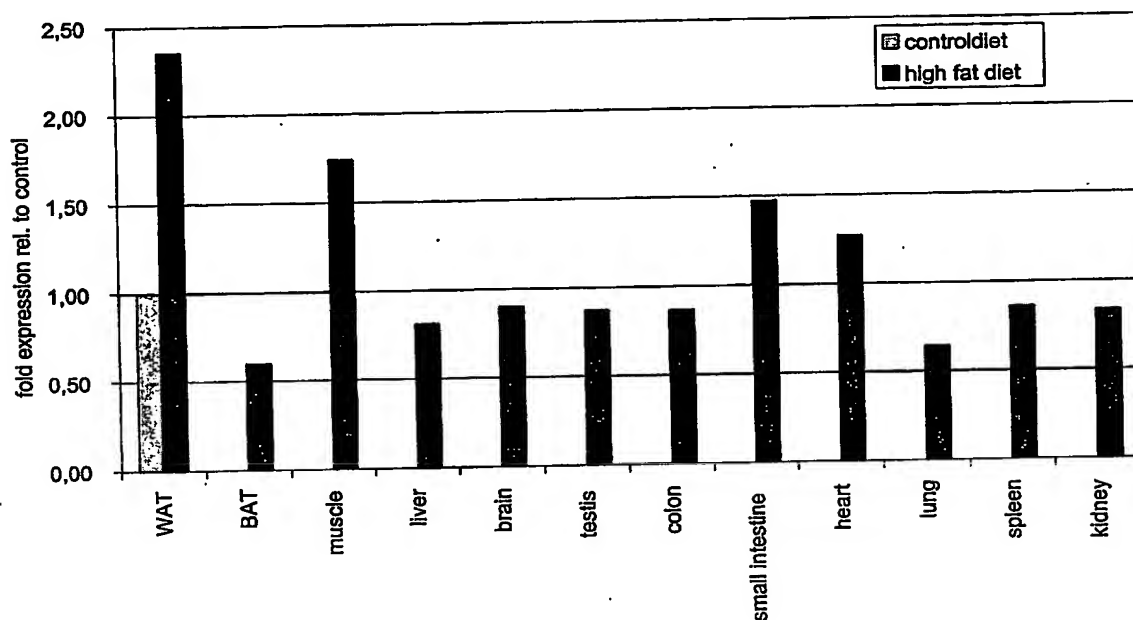


Figure 4G. Real-time PCR analysis of Prl-3 expression in adipocytes during differentiation of 3T3-L1 cells from preadipocytes to mature adipocytes

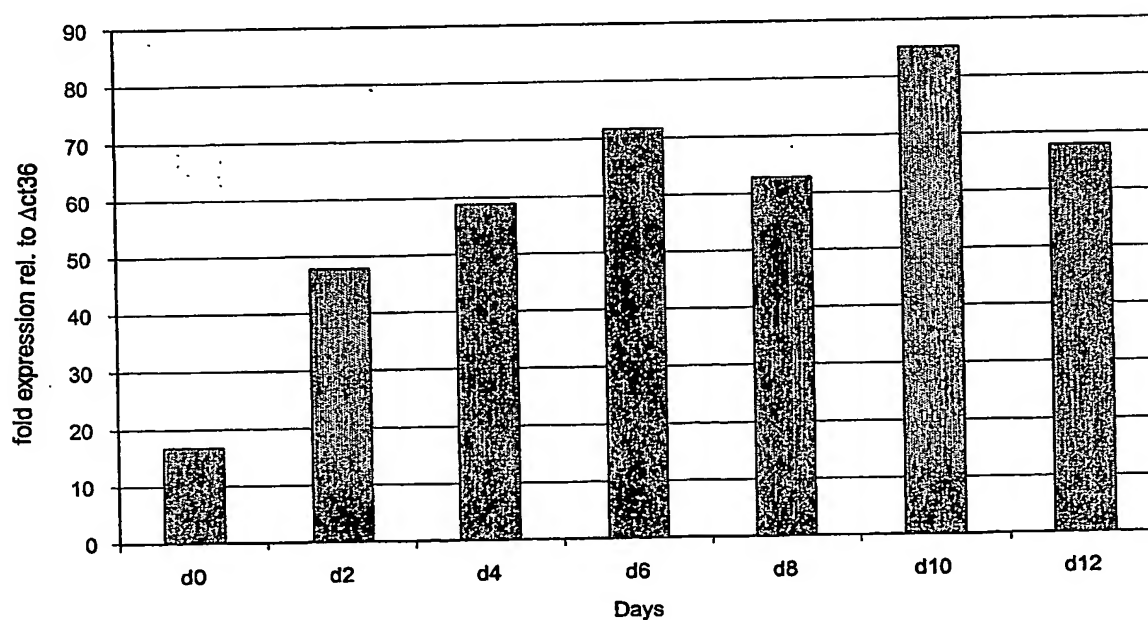
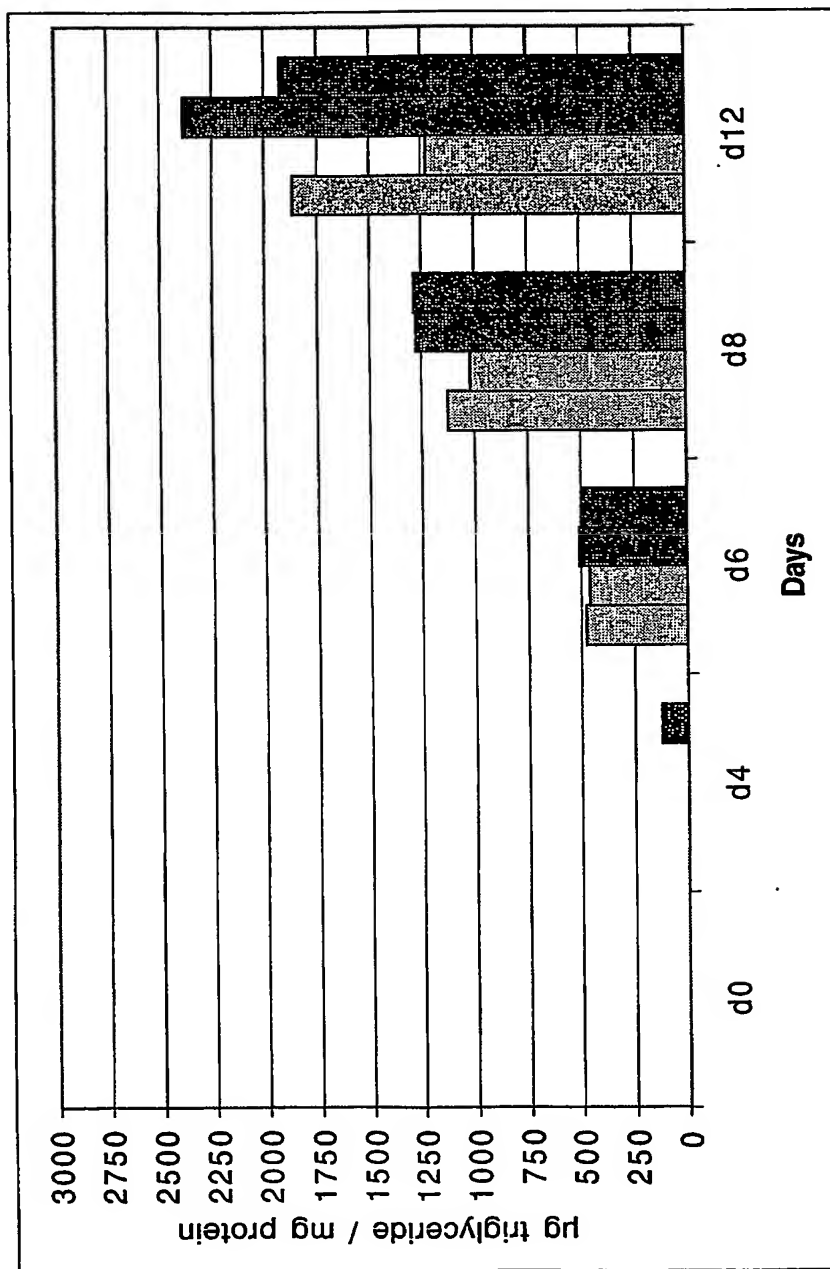


Figure 5. In vitro assays for determination of triglyceride storage and glycogen levels in adipocytes overexpressing Prl-1

Figure 5A. Up-regulation of cellular triglyceride levels in cells overexpressing Prl-1



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Figure 5B. Up-regulation of cellular glycogen levels in cells overexpressing Prl-1

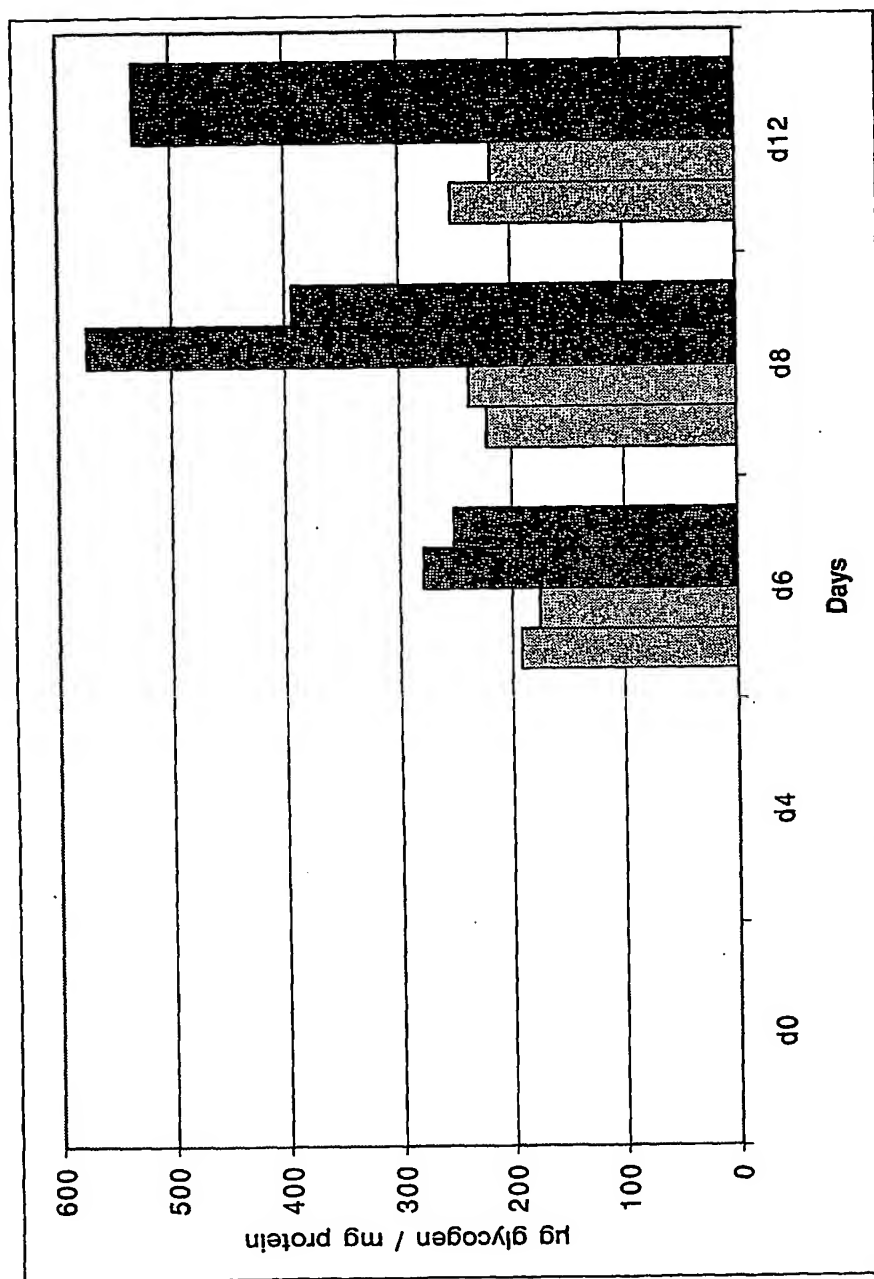


Figure 6. In vitro assays for determination of lipid synthesis and esterification of free fatty acids in Prl-1 loss of function (LOF) adipocytes

Figure 6A. Lipid synthesis levels on day 6 of differentiation in Prl-1 LOF 3T3-L1 cells

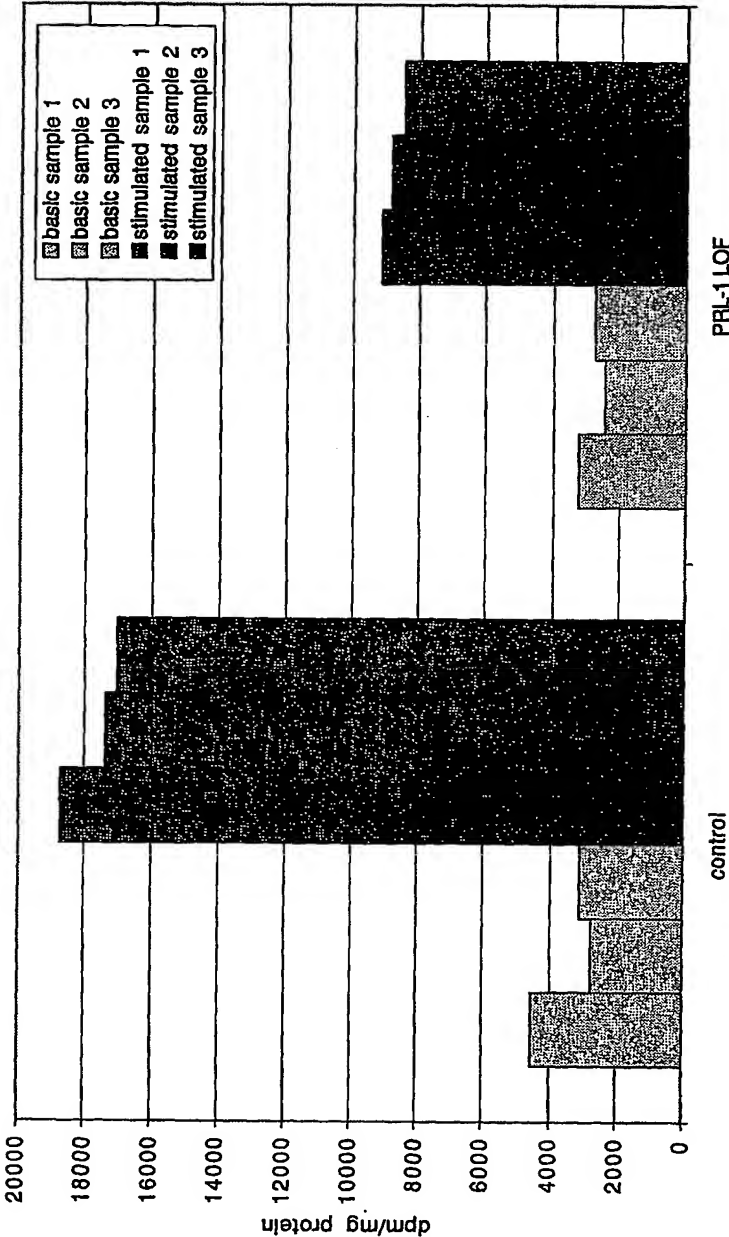
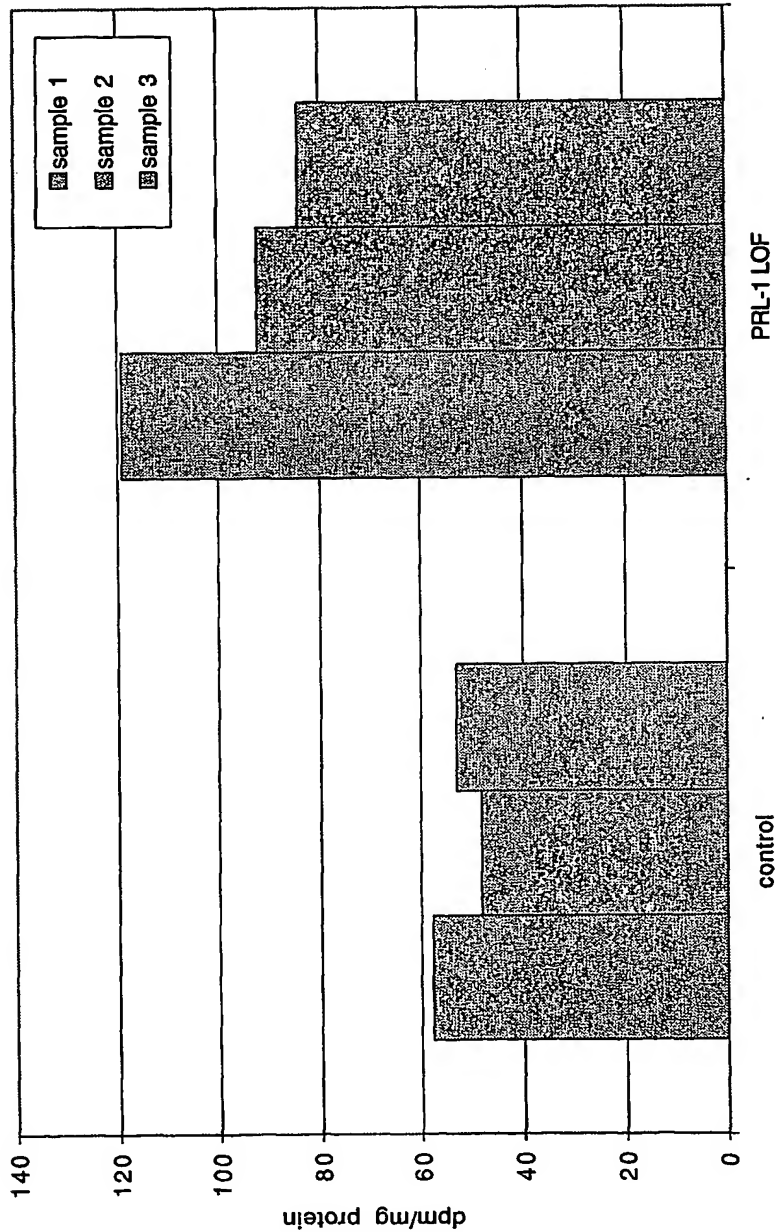


Figure 6B. Fatty acid esterification levels after free fatty acid uptake on day 12 of differentiation in Prl-1 LOF 3T3-L1 cells



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Figure 7. Expression of human *PRL-1* homologs in mammalian (human) tissue

Figure 7A. Microarray analysis of *PRL-1* expression in abdominal derived primary adipocyte cells during the differentiation from preadipocytes to mature adipocytes

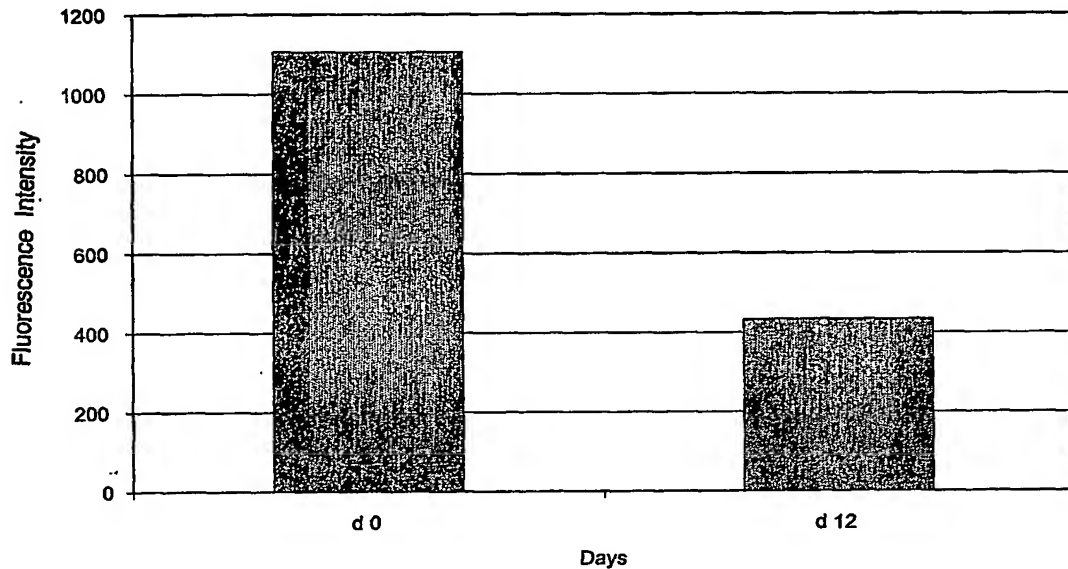
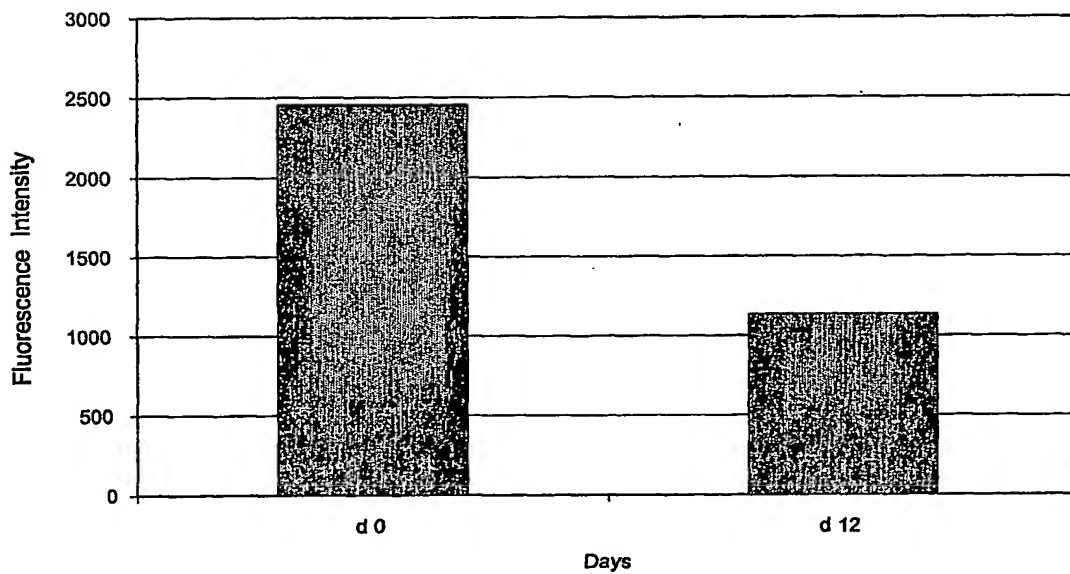


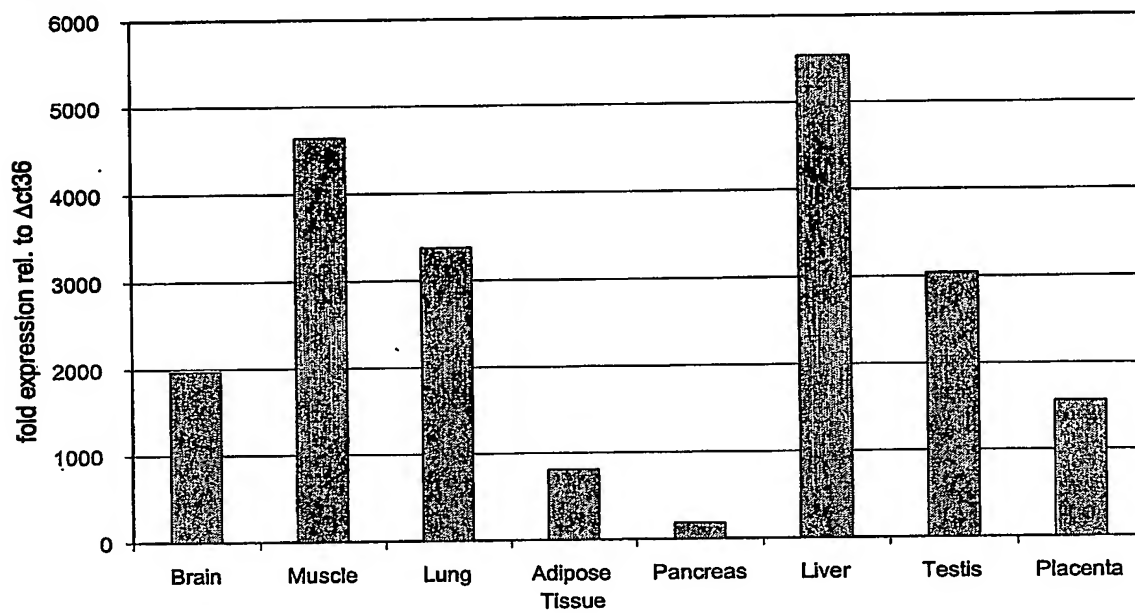
Figure 7B. Microarray analysis of *PRL-1* expression in a human adipocyte cell line during the differentiation from preadipocytes to mature adipocytes



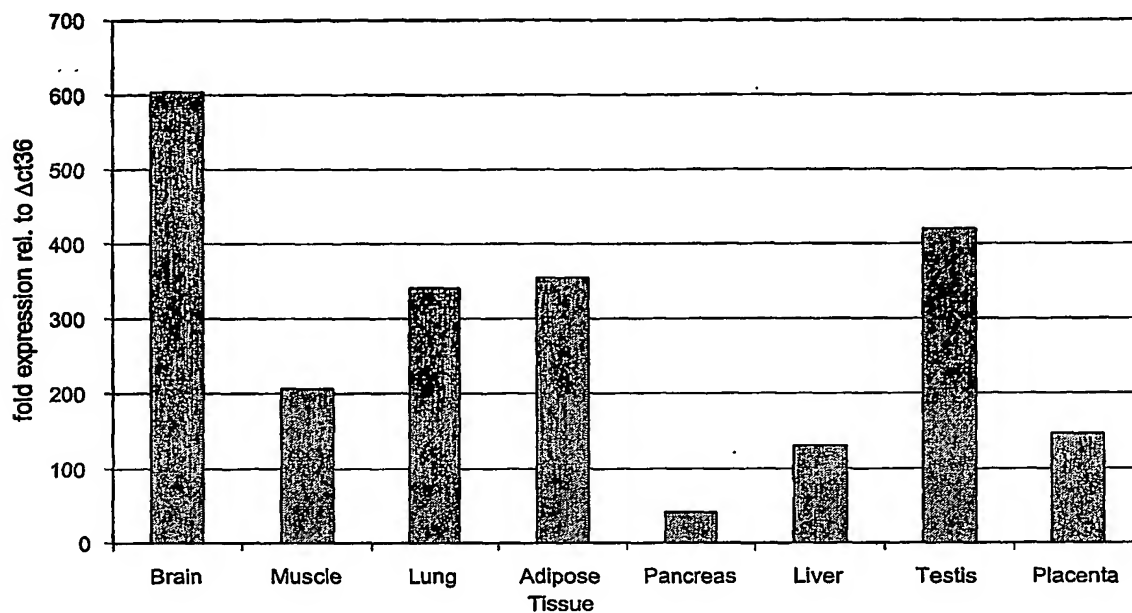
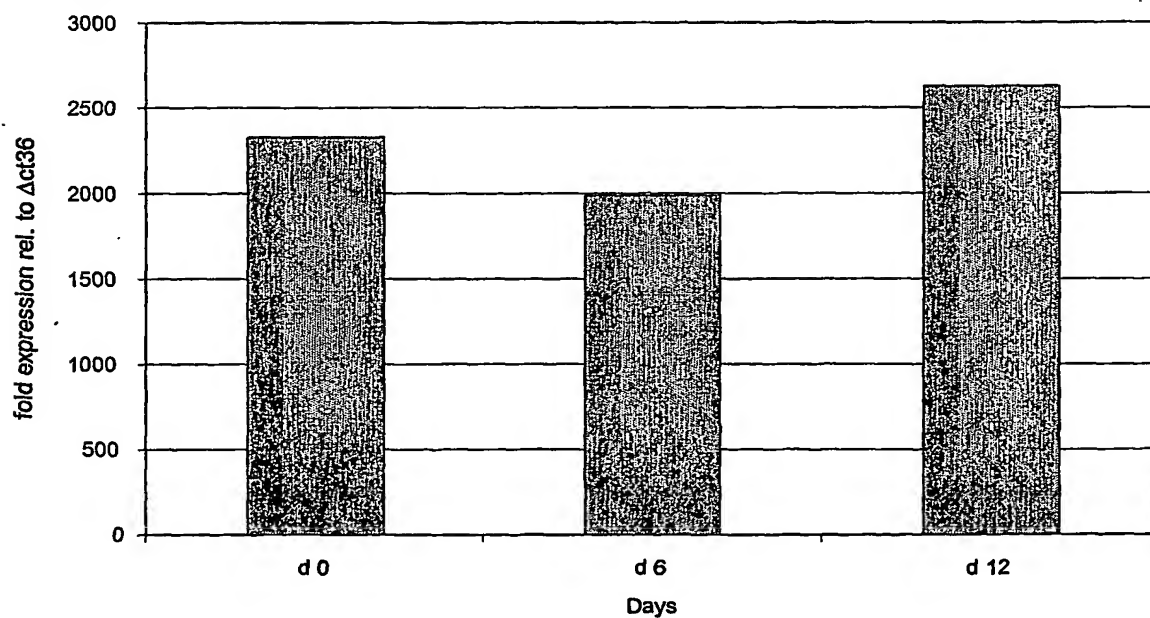
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Figure 8. Real-time PCR analysis of the expression of *PRL-1* homologs in different human tissues

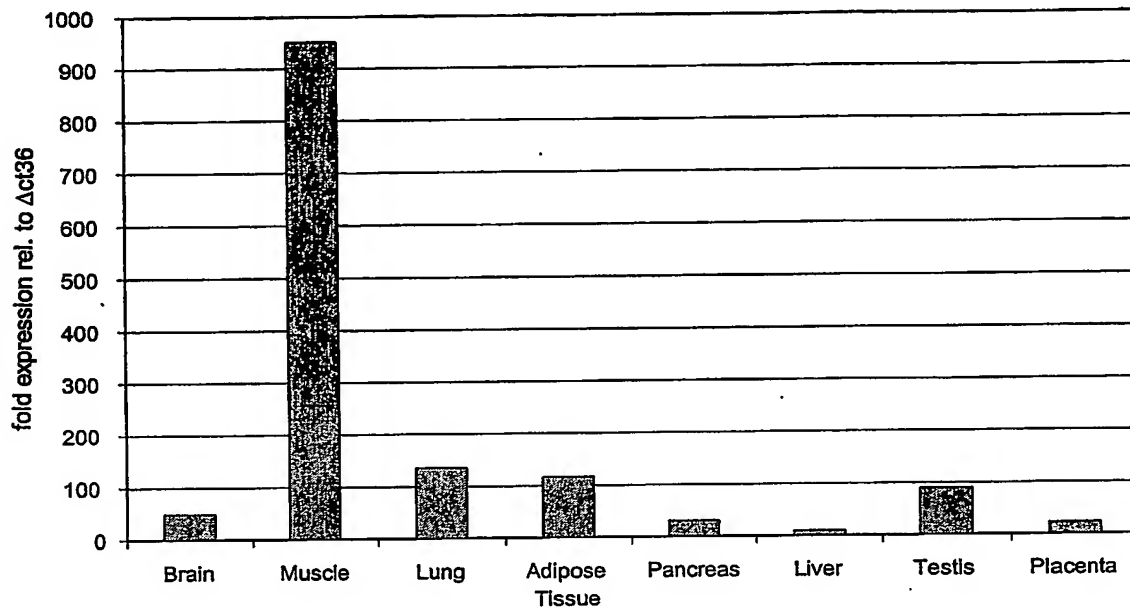
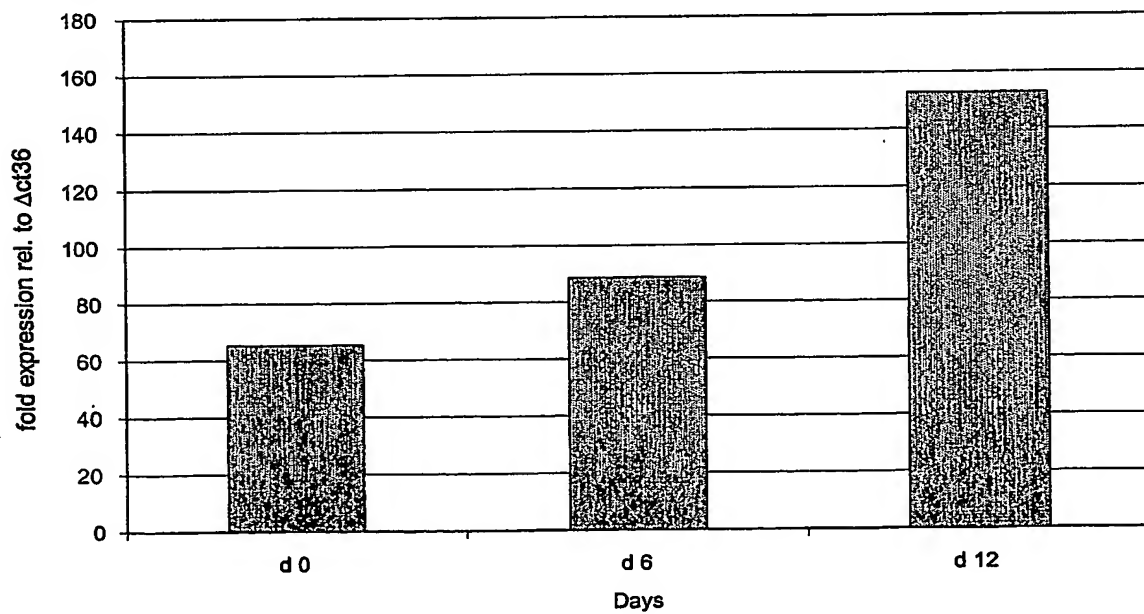
Figure 8A. Real-time PCR analysis of PRL-1 expression in different human tissues



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Figure 8B. Real-time PCR analysis of PRL-2 expression in different human tissues**Figure 8C. Real-time PCR analysis of PRL-2 expression in human primary adipocytes during preadipocyte differentiation**

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Figure 8D. Real-time PCR analysis of PRL-3 expression in different human tissues**Figure 8E. Real-time PCR analysis of PRL-3 expression in human primary adipocytes during preadipocyte differentiation**

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Figure 9. In vitro assays for determination of free fatty acid and glucose uptake by adipocytes overexpressing Prl-1

Figure 9A. Up-regulation of free fatty acid uptake in SGBS cells overexpressing Prl-1

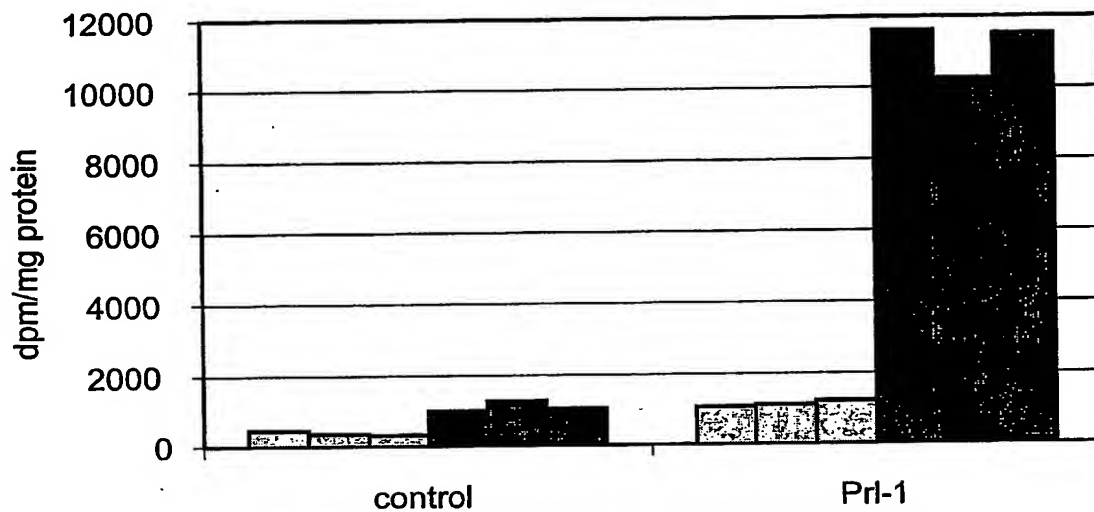


Figure 9B. Up-regulation of glucose uptake in SGBS cells overexpressing Prl-1

